

Field Identification of Crab Predation on *Shaskyus festivus* and *Ocenebra poulsoni*

(Prosobranchia : Muricidae)

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SEVERAL CRAB SPECIES chip open gastropod shells to feed on their contents (MAGALHAES, 1948; SHOUP, 1968). The prey, which may be either snails or hermit crabs, can seldom be identified by examination of the chipped shells. Since edible crabs are usually secretive creatures, direct observation of crab predation in rocky intertidal areas is difficult. However, an analysis of recapture data obtained during a three year study of the snails *Shaskyus festivus* (Hinds, 1843) and *Ocenebra poulsoni* (Carpenter, 1856) does provide indirect evidence of crab predation on living snails in the field.

Shaskyus and *Ocenebra* populations were found in an intertidal boulderfield $\frac{1}{2}$ mile north of Scripps Institution of Oceanography in La Jolla, California. The hermit crab *Pagurus samuelis* (Stimpson, 1857) inhabited the shells of deceased snails. Another resident of the boulderfield, the crab *Cancer antennarius* Stimpson, 1856, attacked living *Shaskyus* and *Ocenebra* in the laboratory, but no attacks by *Cancer* were observed during more than 500 hours of observation in the boulderfield. Shells chipped by crabs represented $8.5 \pm 2.2\%$ and $21.3 \pm 3.3\%$, respectively, of field collections of *Shaskyus* ($N = 575$) and *Ocenebra* ($N = 1129$) shells inhabited by hermit crabs.

A census of marked *Shaskyus* and *Ocenebra* shells was taken monthly for 39 consecutive months. Indirect evidence of *Cancer* attacks on living snails in the field was obtained by comparing the numbers of crab-damaged, marked shells observed per shell per month (shell-month) of observation during 2 time periods. The first period extended from the time that the snail was last seen alive until the time that its shell was first observed after its death. The second period extended from the time that the shell was first discovered after the snail's death until the last time that the shell was seen in the field. A significantly higher rate of shell damage during the first period would suggest that the crabs were feeding on living or dying snails in addition to hermit crabs. Since both living

snails and hermit crabs can be at risk during the first period, the test is conservative, *i. e.*, evidence favoring crab predation on living snails is concealed.

Damaged *Shaskyus* shells were discovered at the rate of 4 in 561 shell-months during the first period and 1 in 151 shell-months during the second period; damaged *Ocenebra* shells were discovered at the rate of 12 in 1298 shell-months during the first period and 1 in 326 shell-months during the second period. The numbers of damaged shells can be treated as Poisson variables if the numbers of shell-months in each period are made equal. Their differences were tested by means of the table of significant differences in PEARSON & HARTLEY, 1966. To remain on the conservative side while equalizing the time periods, I reduced the first period rates to 1.08 in 151 shell-months and 6.28 in 326 shell-months for *Shaskyus* and *Ocenebra*, respectively. No significant differences between the rates for the 2 periods were found for *Shaskyus*, but the difference for *Ocenebra* was significant ($P < 0.04$, one-tailed). This higher rate of discovery of damaged shells during the first period suggests that the crabs were feeding on *Ocenebra* as well as on hermit crabs. The thick varices on the *Shaskyus* shell resist chipping by crabs and probably account for the difference in the proportions of damaged shells for the 2 species.

Literature Cited

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